

Friction welding

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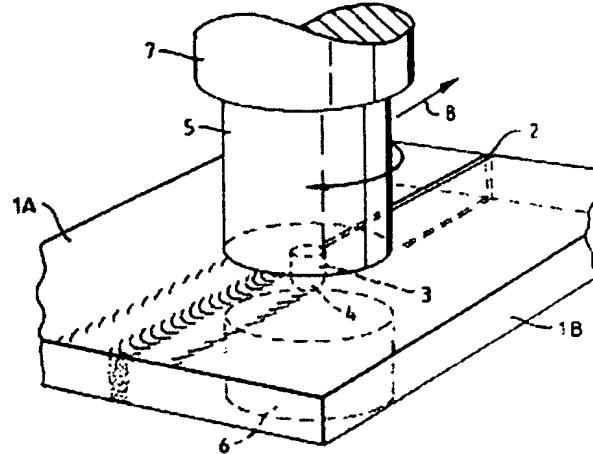
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PCT No. PCT/GB92/02203 Sec. 371 Date Aug. 1, 1994 Sec. 102(e) Date Aug. 1, 1994 PCT Filed Nov. 27, 1992 PCT Pub. No. WO9310935 PCT Pub. Date Jun. 10, 1993. A method of operating on a workpiece comprises offering a probe of material harder than the workpiece material to a continuous surface of the workpiece causing relative cyclic movement between the probe and the workpiece while urging the probe and workpiece together whereby frictional heat is generated as the probe enters the workpiece so as to create a plasticized region in the workpiece material around the probe, stopping the relative cyclic movement, and allowing the plasticized material to solidify around the probe. This technique, which we refer to as "friction plunge welding" provides a very simple method of joining a probe to a workpiece. The method can be used for repairing cracks and the like within a workpiece or for joining members, such as studs or bushes, to a workpiece. Another aspect of the invention comprises causing a probe of material harder than the workpiece material to enter the joint region and opposed portions of the workpieces on either side of the joint region while causing relative cyclic movement between the probe and the workpieces whereby frictional heat is generated to cause the opposed portions to take up a plasticized condition, removing the probe, and allowing the plasticized portions to solidify and join the workpieces together. This technique, which we refer to as "friction stir butt welding" enables a wide variety of workpieces to be joined using a "non-consumable" probe without the problems of oxidation and the like.



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